

## Methods

### Bald Eagle Productivity Monitoring

All known and suspected bald eagle breeding areas are surveyed to collect the following data: nest occupancy, breeding activity, breeding success, and number of advanced young produced. All nest sites are visited a minimum of twice: early for an activity (incubation) check and later for a productivity check. In most cases, additional activity checks are necessary to more clearly document activity or to locate new alternate nest sites. Nesting chronology is monitored where reliable data can be obtained.

Activity checks are completed by a combination of aerial and ground or boat surveys. Most early ground checks are from long distance with spotting scopes to avoid disturbance to adults. Later visits are made to measure productivity at active nest sites. Nestlings are banded during this visit where nest trees can be safely climbed. Our experience of 17 years of monitoring bald eagle nesting activity and productivity in this region suggests an area-specific strategy for bald eagle monitoring (see Appendix Table 1, Whitfield et al. 1995).

Within the Idaho portion of the GYE, two geographic breeding units have been designated, the Snake Idaho Unit, and the Continental Idaho Unit. In 1988, all territories within each unit were numbered consecutively by geographic location, beginning at the most southerly site on Palisades Reservoir and proceeding to the north end of the Continental Unit. New territories found since 1988 have been numbered chronologically.

Definitions used for bald eagle reproductive terminology are as follows:

Breeding area. This refers to the area used by one nesting pair of adult bald eagles and containing one or more nest sites.

Occupied breeding area or nest. A breeding area, or nest within a breeding area, with evidence of bald eagle use during part of the breeding season. Occupancy occurs if a) two adults are seen at or near an empty nest within the breeding season, b) one adult and one subadult are seen at or near a nest during the breeding season and there are displays of reproductive behavior, c) there is clear evidence of recent nest repairs or new nest construction, or d) observations that identify the nest as active as defined below.

Active breeding area or nest. Incubating pair. A breeding area, or nest within a breeding area, with clear evidence of bald eagle reproductive effort during the breeding season. An active nest is one where incubation, eggs, or nestlings are observed. Incubation posture does not necessarily infer incubation, and actual incubation should be assumed only if an adult remains in the posture for several hours or an exchange of incubation duty by adults is observed. (Revised GYE Bald Eagle Working Group guidelines substitute Active with the term "Incubating Pair".)

Successful breeding area or nest. A breeding area, or nest within a breeding area, where advanced young are produced. Advanced young are young of the year at or near fledging age.

### **Bald Eagle Breeding Area Key Habitat Identification**

At selected bald eagle breeding areas, breeding adult and nestling behavior are monitored to learn area specific habitat needs. In earlier years, this monitoring effort was much more intensive, with radio telemetry sometimes used to aid observations (Whitfield et al. 1991, Whitfield 1993). For this project, our observations are limited to approximately 6 observation periods (4 hours each) at each breeding area during the nesting season to provide preliminary delineation of primary use areas, nest site management zone II (GYE Bald Eagle Working Group 1995). These preliminary observations are typically centered at the nest site, and do not provide a complete picture of a breeding pair's habitat use. Observers monitor from a distance with spotting scopes.

### **Raptor Monitoring Program**

Our raptor inventory is iterative over the five years of the project, with an additive progression through phases as the data is collected and analyzed. We include here a summary of the methods to be used over the life of the project to provide perspective for each year's work (see Whitfield et al. 1995). Sampling methods, including raptor species detection and estimation of relative abundance and breeding productivity, must be species specific. Once our inventory has provided a reliable baseline, we will develop a long-term monitoring program for the raptors of the South Fork study area.

#### **Breeding Raptor Detection.**

We apply species-specific raptor detection methods. We provided a literature review of raptor detection methods in Whitfield et al. 1995. We will also analyze detectability models from a statistical perspective as the project progresses.

#### **Raptor Inventory.**

Our raptor inventory occurs in two phases as follows:

Phase 1. Presence/Absence Sampling. Sample sites are selected to cover a broad array of biological and physical attributes; such coverage will help assure adequate representation of species composition and distribution over the study area. Sampling must be exhaustive enough to minimize under-sampling effects on patterns while allowing true patterns or gradients across the study area to be identified, described and predicted. With respect to monitoring, sampling must also ensure that study-wide trends and change can be distinguished from localized fluctuations (McKenzie et al. 1991). Hence the number, placement, and size of the sample sites will require careful consideration from both the biological and statistical perspectives.

In 1995-96, we entered all potential samples, all square mile sections within the study area, into a Latin Square table with samples containing similar habitats grouped within the table. We then randomly selected samples according to a Latin Square plus 1 design. We used mapped legal sections because there are often section markers on the ground that aid in sample location. We selected from all square mile sections that were at least 50% within 1 mile of the river. We then individually sampled all 40-acre quadrats (16 per square mile section) within selected sections.

In 1996-97, we deviated from our intended schedule to learn more habitat specificity for nesting habitat selection. We sampled from a larger sample group than visited in 1995, and described more specific vegetative features than described earlier.

### Habitat description

For Phase 1 surveys (presence/absence) completed in 1995 and reported in Whitfield and Maj, 1996, we characterized each 40 acre sample quadrat by general vegetation cover type according to the system developed by Ulliman et al. (1991), which includes 30 cover types (Table 2, Whitfield and Maj 1996). We indicated the dominant cover type found within each quadrat, with recognition that many quadrats feature a complex mosaic of vegetative cover types (Appendix Table 5, Whitfield and Maj 1996).

In 1996-97, our habitat measures were more refined to characterize features selected by individual raptor species. As this project matures, we hope to characterize, at a landscape level, habitat features found within areas estimated to include the home ranges of nesting raptor pairs. We will also measure habitat features around all nest sites to determine those features of importance to nest occupancy and success.

## Results and Discussion

### I. 1996 Bald Eagle Nesting Activity and Productivity

In 1996, 45 bald eagle breeding areas were known within the Southeast Idaho portion of the Greater Yellowstone Ecosystem (GYE). Of this total, 27 were found within the Snake Idaho Unit of the GYE population, and 18 in the Continental Idaho Unit (Table 2). Overall, the ratio of young produced per occupied breeding area (outcome known) was 1.00. Results of activity and productivity surveys at each breeding area were reported earlier (Whitfield et al. 1996).

Despite a wet 1996 spring, bald eagle productivity at Idaho sites was relatively good. All 27 known breeding areas in the Snake Idaho unit were occupied, and 25 of these breeding areas were active. (Productivity outcome was unknown at the new site on Ririe Reservoir. This area was excluded from ratios.) In the Snake Idaho population unit, a total of 27 young were produced at 16 successful sites, for productivity ratios of

1.04 advanced young/occupied site, 1.12 advanced young/active site, and 1.69 advanced young/successful site.

In the Continental Idaho unit, 16 of 18 known breeding areas were occupied, and 14 were active. Fifteen young were produced at the 11 successful sites, for productivity ratios of 0.94 advanced young/occupied site, 1.07 advanced young/active site, and 1.36 advanced young/successful site.

Three new breeding areas were located in 1996: Clark's Hill (18-IS-25) on the South Fork, Ririe Reservoir (18-IS-26), and Annis Slough (18-IS-27) near the Confluence of the South Fork and Henry's Fork Snake River. Six established pairs built new alternate nests, and two pairs switched to alternate nests used prior to last year.

In 1996 we observed 6 nesting adults that were banded as nestlings in the GYE, and determined the natal nest of 3 of these adults. We also saw two immature bald eagles that were banded at known Idaho sites in prior years. In 1996, 16 Idaho/GYE nestlings were banded with numbered FWS leg bands on the right leg and color bands with stamped two digit alphanumeric codes on the left leg.

**Table 2. Activity and productivity status for bald eagle breeding territories within the Idaho portion of the Greater Yellowstone Ecosystem, 1996.**

<u>TERRITORY NAME</u>	<u>TERRITORY NUMBER</u>	<u>PRODUCTIVITY STATUS</u>	<u>NUMBER ADVANCED YOUNG</u>	<u>NUMBER YOUNG BANDED</u>	<u>COMMENTS</u>
<b>PALISADES RESERVOIR AREA</b>					
Hoffman	18-IS-01	Active, Successful	2	0	New alt. nest
Williams Creek	18-IS-02	Active, Successful	2	2	
Van Point	18-IS-03	Active, Unsuccessful	0	0	
Edwards Creek	18-IS-17	Active, Unsuccessful	0	0	
King Creek	18-IS-18	Active, Unsuccessful	0	0	
<b>SOUTH FORK SNAKE RIVER</b>					
Palisades Creek	18-IS-04	Occupied, Inactive	0	0	Nest repaired, did not incubate
Swan Valley	18-IS-05	Active, Successful	1	0	
Conant Valley	18-IS-06	Active, Successful	2	0	Moved back to alt. 3
Pine Creek	18-IS-07	Occupied, Inactive	0	0	Nests repaired, no inc.
Dry Canyon	18-IS-08	Active, Successful	1	0	
Gormer Canyon	18-IS-09	Active, Successful	2	2	

**Table 2. Activity and productivity status for bald eagle breeding territories within the Idaho portion of the Greater Yellowstone Ecosystem, 1996 (cont.).**

<u>TERRITORY NAME</u>	<u>TERRITORY NUMBER</u>	<u>PRODUCTIVITY STATUS</u>	<u>NUMBER ADVANCED YOUNG</u>	<u>NUMBER YOUNG BANDED</u>	<u>COMMENTS</u>
Wolverine	18-IS-10	Active, Successful	1	0	Moved back to alt. 1
Antelope Creek	18-IS-11	Active, Unsuccessful	0	0	
Cress Creek	18-IS-12	Active, Successful	2	0	
Five Ways	18-IS-24	Active, Successful	2	0	
Clark Hill	18-IS-25	Active, Successful	2	0	New breeding area
<b>MAIN SNAKE RIVER</b>					
Confluence	18-IS-13	Active, Unsuccessful	0	0	
Market Lake	18-IS-22	Active, Successful	1	0	
<b>LOWER SOUTH FORK, HENRY'S FORK, FALL RIVER</b>					
Menan Buttes	18-IS-20	Active, Unsuccessful	0	0	Nest blowdown
Ririe Reservoir	18-IS-26	Active, Unknown	?	0	New, prod. unknown
Annis Slough	18-IS-27	Active, Successful	1	0	New breeding area
Cartier Slough	18-IS-14	Active, Unsuccessful	0	0	
St. Anthony	18-IS-15	Active, Successful	2	0	New alt. nest
Singleton	18-IS-16	Active, Successful	2	0	
Lower Fall River	18-IS-19	Active, Unsuccessful	0	0	New alt., blowdown.
<b>TETON RIVER, SNAKE UNIT</b>					
Upper Teton	18-IS-21	Active, Successful	2	0	
Hog Hollow	18-IS-23	Active, Successful	2	0	
<b>CONTINENTAL UNIT, UPPER HENRY'S FORK SNAKE RIVER</b>					
Kerr Canyon	18-IC-01	Active, Successful	1	1	
Pine Haven	18-IC-02	Occupied, Inactive	0	0	
Box Canyon	18-IC-03	Active, Unsuccessful	0	0	
Coffee Pot	18-IC-04	Active, Successful	1	1	New alt. nest
Bishop Lake	18-IC-05	Active, Successful	1	1	
Sheridan	18-IC-06	Occupied, Inactive	0	0	

**Table 2. Activity and productivity status for bald eagle breeding territories within the Idaho portion of the Greater Yellowstone Ecosystem, 1996 (cont.).**

<u>TERRITORY NAME</u>	<u>TERRITORY NUMBER</u>	<u>PRODUCTIVITY STATUS</u>	<u>NUMBER ADVANCED YOUNG</u>	<u>NUMBER YOUNG BANDED</u>	<u>COMMENTS</u>
Lucky Dog	18-IC-07	Active, Unsuccessful	0	0	
Henry's Lake	18-IC-08	Unoccupied	0	0	
Staley Springs- Targhee Creek	18-IC-09	Active, Successful	1	0	
Hale Canyon	18-IC-10	Active, Successful	2	2	
Moonshine	18-IC-11	Active, Successful	1	1	
Last Chance	18-IC-12	Active, Successful	2	2	
IP Bills	18-IC-13	Active, Successful	1	0	New alt. nest
Flat Rock	18-IC-14	Active, Successful	2	2	
Riverside	18-IC-15	Active, Successful	2	2	
Snake River Butte	18-IC-16	Active, Successful	1	0	New alt. nest
Buffalo River	18-IC-17	Unoccupied	0	0	
Big Bend	18-IC-18	Active, Unsuccessful	0	0	

**Summary Statistics:**

Total number nesting territories: 45

Advanced young/occupied nest<sup>1</sup>: 1.00

Number occupied territories: 43

Number active territories: 39

Advanced young/active nest<sup>1</sup>: 1.11

Number successful territories: 27

Number advanced young: 42

Advanced young/successful nest<sup>1</sup>: 1.56<sup>1</sup> Excludes Ririe Reservoir, 18-IS-26, an active nesting area where productivity outcome was unknown.